ITS Field Operational Test Summary
Adaptive Urban Signal Control and Integration

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Introduction

The Adaptive Urban Signal Control and Integration (AUSCI) ITS Field Operational Test uses advanced adaptive control technology to improve traffic efficiency on a grid network in Minneapolis, Minnesota. The network consists of 56 signalized intersections within the northern end of the central business district. AUSCI aims to enhance the effectiveness and responsiveness of traffic operations and control within this network. The network has historically been subject to increased variability of traffic flow due to incidents, special events, and special land-use characteristics.

The field testing of the components will start in September 1998 and end in January 2000. The Final Evaluation Report is expected in January 2000.

Project Description

The AUSCI system optimizes the operation of a grid network of 56 signalized intersections within downtown Minneapolis and coordinates freeway-arterial traffic management and control via ramp metering. The system uses SCOOT as its optimization and control engine. SCOOT is an acronym for Split Cycle Offset Optimization Technique. It is an adaptive control system that processes real-time traffic volume data to compute traffic signal timing parameters. The system changes these parameters in small increments, as necessary, to maintain an optimized signal operation. AUSCI aims to provide optimized, efficient, responsive, and flexible signal operations to accommodate variations in traffic flow due to incidents, special events, and special land-use characteristics.

Figure 1 depicts the project area consisting of a section of I-394 and applicable downtown surface streets.

The main objectives of the test are:

- Enhance corridor traffic management and control
- Evaluate adaptive traffic control system operation during major events and incidents
- Evaluate adaptive traffic control system effect at the boundary areas
- Evaluate the feasibility of installing and operating an adaptive traffic control system connected to the T2000C server
- Evaluate costs of the adaptive traffic control system versus using only the T2000C based system
- Evaluate system procurement effectiveness through a system partnership agreement
- Evaluate how well the installed system conforms to the design concept

- Evaluate interagency cooperation required to successfully operate an adaptive traffic control system.

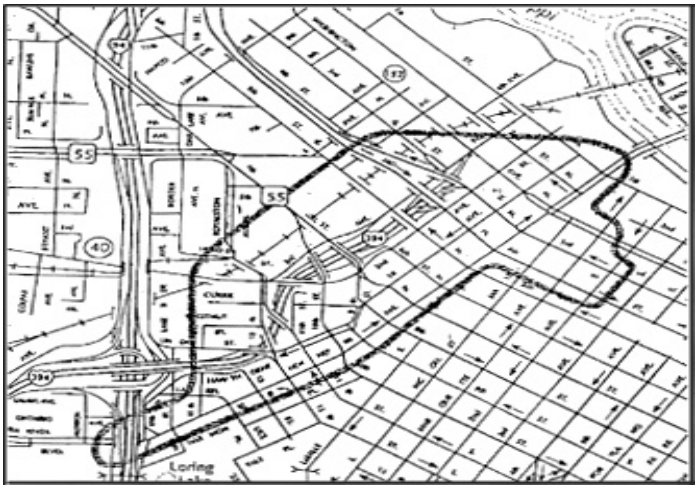

Figure 1: AUSCI Project Area

The AUSCI project is installing controller and cabinet equipment, system hardware, machine vision detection system, surveillance cameras, and additional communications links in the test area. The project is also developing, testing, installing, and integrating software to connect the SCOOT server to the current Minneapolis T2000C central server.

A total of 148 intersection approaches will be instrumented with a machine vision detection system to provide three types of outputs: detection data for SCOOT input, image data to the operator, and data collection for evaluation. Test partners chose a machine vision detection system to meet the detection needs of SCOOT since it is very detector-dependent.

The system operates using a T2000C server to process all communications to and from the field controllers. The SCOOT server links to the T2000C system and receives traffic input information after the T2000C server has translated it into a form usable by SCOOT. The SCOOT server runs its optimization algorithms and sends the signal control instructions to the T2000C server. The T2000C server formats the instructions and transmits them to the field equipment.

The test evaluates the performance, transportation impacts, deployment cost, and institutional issues associated with implementing the adaptive traffic control system.

Test Status

Test personnel are currently installing system devices and equipment and developing the system software. Test personnel will conduct an initial implementation phase in early 1998 to perform validation and acceptance testing. This initial implementation will encompass approximately 15 to 20 intersections.

Test Partners

City of Minneapolis

Federal Highway Administration

FORTRAN Traffic Control

Image Sensing Systems

Minnesota Department of Transportation

Westwood Professional Services

References

None published.